

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

(12) UK Patent Application (19) GB (11) 2 085 845 A

(21) Application No 8132019

(22) Date of filing 23 Oct 1981

(30) Priority data

(31) 8007463

(32) 23 Oct 1980

(33) Sweden (SE)

(43) Application published
6 May 1982

(51) INT CL³

B65G 63/00

(52) Domestic classification
B8Q 2DX

(56) Documents cited

GB 1556956

GB 1470488

GB 1411274

GB 840419

GB 797699

(58) Field of search

B8E

B8Q

(71) Applicants

Hiab-Foco Svenska

Försäljnings

Aktiebolag,

P.O. Box 325,

S-151 24 Södertälje,

Sweden.

(72) Inventors

Gunnar Engstrom

(74) Agents

D. Young & Co.,

Chartered Patent Agents,

10 Staple Inn,

London WC1V 7RD.

(54) Load changers for vehicles

(57) A load changer for a vehicle (5) comprises an angular handling arm (1) which, when in a normal loading position, comprises a horizontal part (2) and a vertical part (3). The horizontal part (2) is rotatably mounted on a transverse shaft (4) on the vehicle (5) and the vertical part (3) is provided with means (6) for hooking on to a corresponding

hooking attachment of a load container. The load changer is designed also to facilitate handling of other types of load containers (8'), with the aid of wires (13), chains, cables or the like, and for this purpose includes a support arm (14) which at one end thereof is pivoted at or near the upper end of the part (3) and can swing between a position against the part (3) and an outward position where it constitutes an extension of the part (3). The support arm (14) is furnished at its outer end with a guide for a wire loop (13) and has corresponding guides at its pivot pins. The support arm (14) is rotatable backwards in a direction towards the load container (8'), and at the front side of the vertical part (3) the handling arm is fitted with a hooking means, preferably in the form of hydraulic cylinders (26,27), for hooking the wire loop (13). The support arm (14) can be swung with the aid of one or more hydraulic cylinders (15).

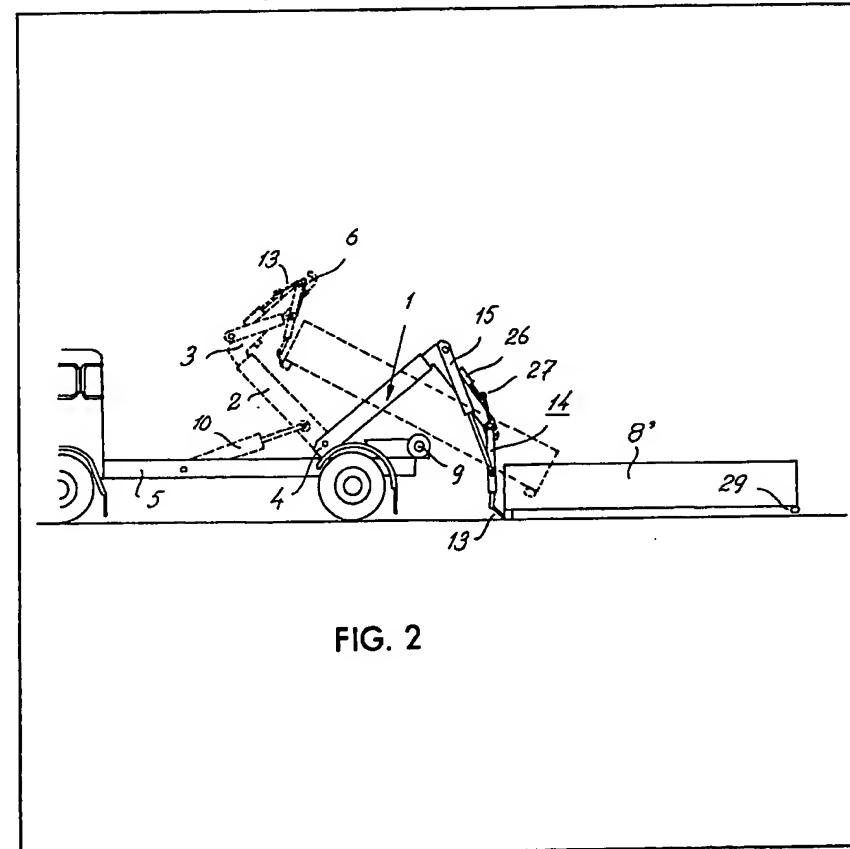


FIG. 2

GB 2 085 845 A

AAA

2085845

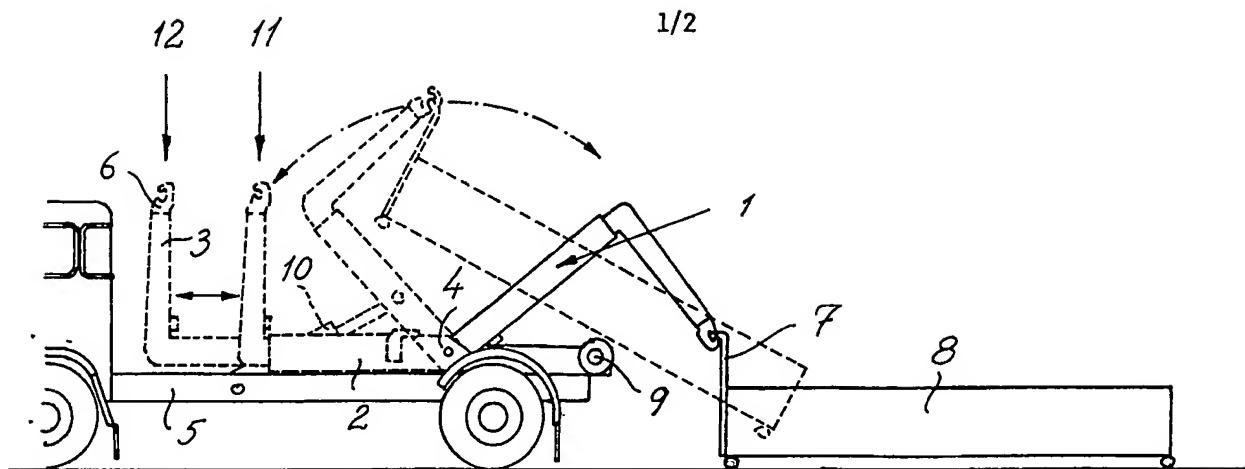


FIG. 1

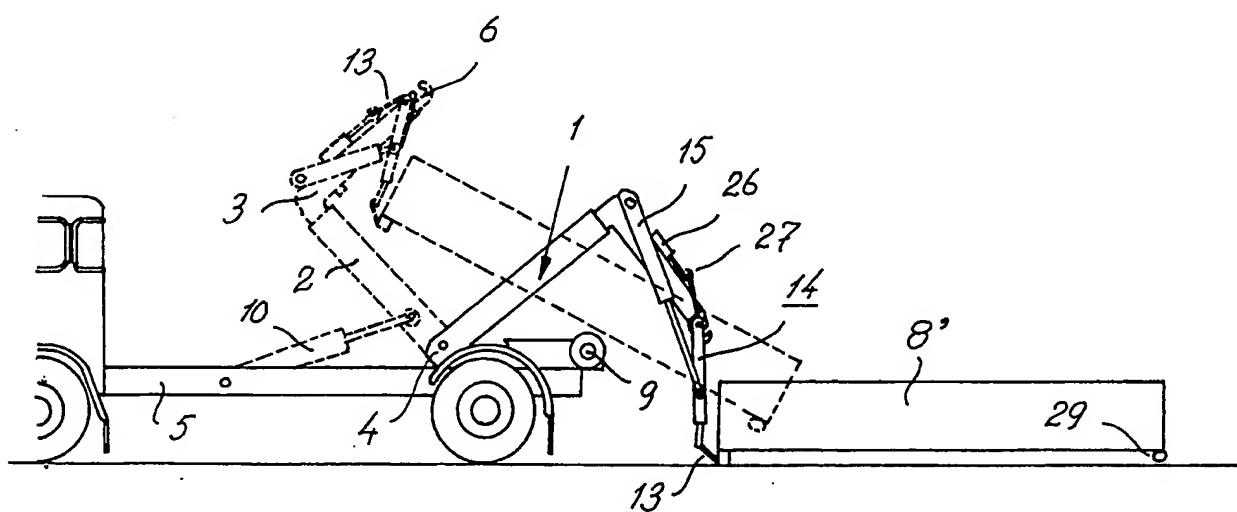
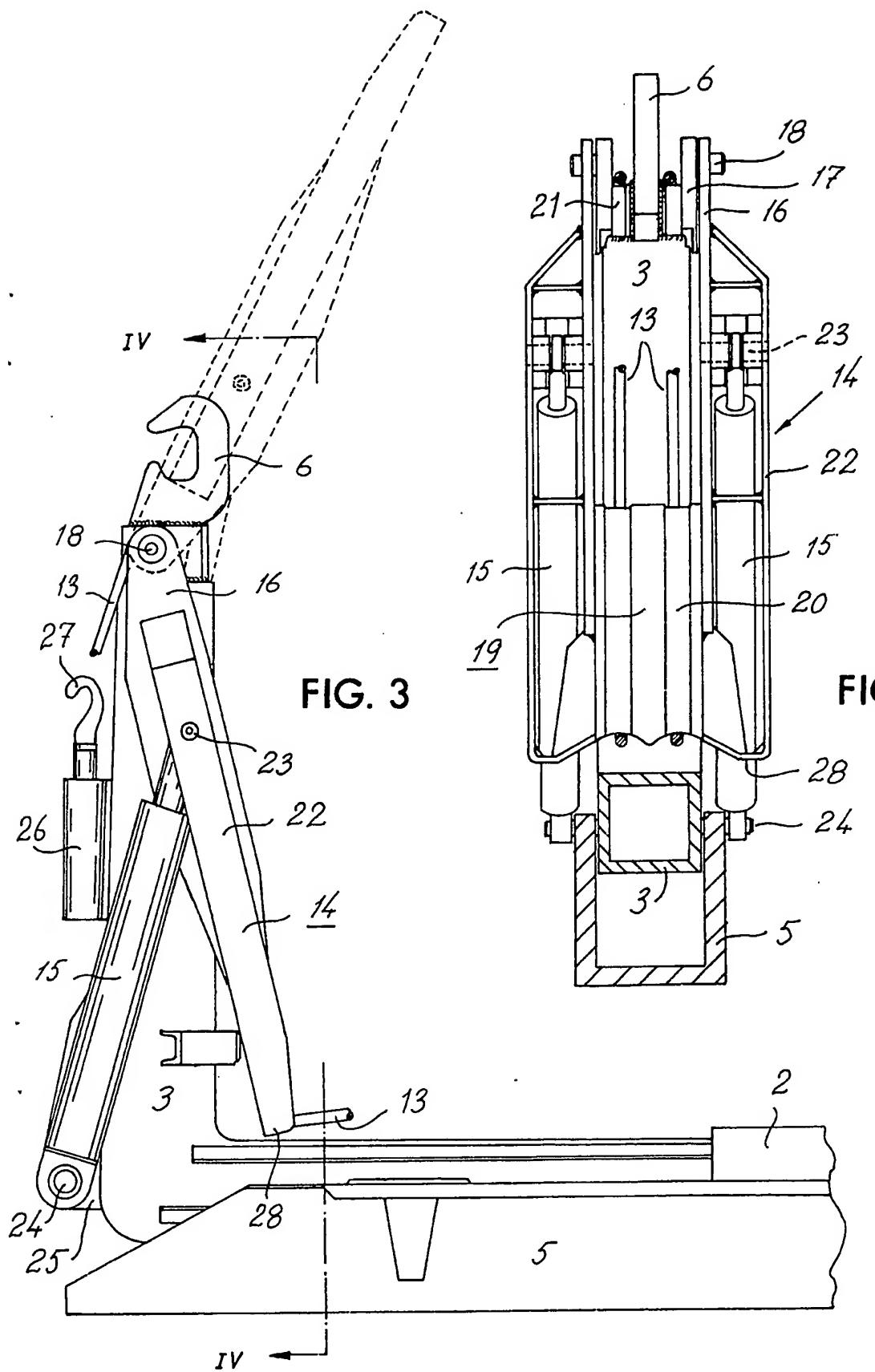


FIG. 2



SPECIFICATION

Load changers for vehicles

5 This invention relates to load changers for vehicles, for handling load carriers such as containers, tanks and crates.

A known load changer appliance - disclosed for example in US Patent No. 3 819 075 - for handling 10 containers, tanks, crates, and the like on a vehicle, comprises an angular lift or handling arm which at one end is rotatably mounted on a transverse shaft in the vehicle and which at its other free end is provided with a hook which co-operates with a 15 hooking attachment on the container or the like which is to be handled. The lift arm is arranged, with the aid of hydraulic or pneumatic cylinders, to be rotatable between a transport position, in which one 20 part of the arm is horizontal and another part is vertical, and in which the horizontal part of the arm rests on the vehicle and the hook at the free vertical end of the arm holds the container in a fixed position, and an on/off loading position, in which the handling arm is swung in an upwards-backwards- 25 downwards sense to remove a container and set it down on the ground or some other plane behind the vehicle, or, from the same plane, to lift and unload the container.

To enable the rotatable angular arm with its lifting 30 hook to grip and hold the container, the front end of the container is equipped, preferably at a high point thereon, with a holding or hooking attachment for the hook. Such hooking attachment can be a ring or the like mounted on the container or it can be part of 35 a frame to which the container is assembled.

Loading a container onto the vehicle is effected by swinging the angular lifting arm backwardly and manoeuvring the vehicle to a position in which the hook of the lifting arm connects with the hooking 40 attachment on the container, after which the arm is swung in an upwards-forwards-downwards movement so that the lift arm's horizontal part rests on a chassis of the vehicle and the container is loaded on the chassis. The lift arm's vertical part, in some types 45 of load changer, is horizontally extendable out from the horizontal part, whereby extended ability to handle containers is provided.

Thus, the above known load changing device or 50 load changer is limited to handling containers or the like which are equipped with hooking attachments designed to engage with the hook. However, many containers do not have such hooking attachments. It would be desirable to be able to handle containers which do not have the above-described hooking 55 attachments, which attachments are designed only for use with the known load changer. Some containers or load carriers are equipped at the lower edge of the front end with a wire loop. Other load carriers have a hook, a ring or the like, in which a wire, chain 60 or the like can be engaged. If a load changer of the type described above is used for handling load carriers having a wire, chain or other flexible means, serious problems can arise. When lifting the container or load carrier, it slides over the rear edge of the 65 vehicle as shown by the dotted lines in Figure 1 of

the accompanying drawings, in which the load carrier is designated by the reference numeral 8. The load carrier initially slides or is wheeled along with its rear edge in contact with the ground, but at a certain 70 point loses contact with the ground. At a certain point the load carrier reaches a balanced position. If at this position the load should shift backwards, the load carrier will swing suddenly in the sense that its front end moves upwards and backwards, which is 75 made possible by the flexible coupling of the load carrier to the lift arm provided by the wire or chain. If the lift arm continues its rotation and the load carrier is drawn onto the vehicle, an opposite situation can occur, which is that the load carrier falls with a great 80 impact down onto the lift arm or chassis. Such severe movements can cause damage to the lift arm, the vehicle and the operating personnel.

According to the present invention there is provided a load changer for a vehicle, the appliance 85 comprising an angular handling arm having one end thereof rotatably mounted or capable of being rotatably mounted on a transverse shaft in the vehicle and provided or formed at its other, free end with a hooking means for engaging a corresponding 90 holding means on a load carrier, wherein a part of the handling arm which, in a normal loaded position, extends substantially vertically, carries a support arm which at one end thereof is pivoted at or near an outer end of said part of the handling arm, and 95 wherein, by the action of one or more actuating cylinders, the support arm can be swung between a folded position close to said part of the handling arm and an outward position in which the support arm constitutes an extension of said part of the handling 100 arm.

A preferred embodiment of the invention described below comprises a load changer essentially of the type described above, but modified in that different kinds of load carriers can be handled, especially those with wires, chains, cables or other 105 flexible hooking attachments.

In the preferred embodiment the support arm is formed or provided, partly in a free, outer end and partly at the pivoted inner end, with guides for wires, 110 chains or cables or other flexible means, and on the handling arm is an arrangement for hooking the wire, chain or cable. Preferably, the wire chain or cable is formed as a loop, the two sides of which can be drawn down the support arm's outer and inner 115 guides and fastened in handling arm fastening means.

The invention will now be further described, by way of illustrative and non-limiting example, with reference to the accompanying drawings, in which:

120 *Figure 1* shows a basic load changer or load changer appliance, the Figure showing diagrammatically different phases of the handling of a load carrier;

125 *Figure 2* shows in a similar manner a modified load changer embodying the invention in two different handling phases;

Figure 3 is a side view in more detail of the load changer of *Figure 2*; and

Figure 4 is a sectional view of the load changer 130 taken along the line IV-IV in *Figure 3*.

actuating the loop cylinder 26 so that the wire loop 13 can be held in the required taut condition. Adjustment can be effected in order to both increase and decrease the tautness of the wire. When the 5 handling arm 1 rotates to a certain position the load carrier 8' will glide over the vehicle's rollers 9 and the rotation continues until the handling arm 1 arrives at its horizontal position, as shown in Figure 1, and the load carrier 8' rests on the vehicle's chassis. In the 10 case where the handling arm's vertical part 3 is telescopic, an extension can be made, and the load carrier 8' is moved an equivalent distance forwards on the chassis. The load carrier 8' is now in a transport position and is locked into position by the 15 support arm 14 and wire loop 13 and cannot shift in any horizontal direction on the vehicle's chassis or lift at its front end. In other cases it may be required to move the load carrier backwards a greater distance than is possible by telescoping the vertical arm part 20 3 and, in such situations, the loop cylinder 26 is released so that the wire loop 13 slackens, after which the support arm 14 is swung out by actuation of the pivot cylinders 15 and the outer end 28 of the support carrier moves the load carrier. Such a 25 movement of the load carrier can naturally be made while the load carrier is resting on the ground or on a loading quay or the like.

As has been pointed out earlier, the load changer can be used with load carriers 8 with hooking 30 attachments 7 specially designed for use therewith, without obstruction from the support arm 14. When this is completely folded in as shown in Figure 3, it presents no obstruction to the conventional handling of load carriers.

35 If so required, the support arm 14 can be shaped at its outer end as a hook, with which it is possible to handle a load carrier with a ring or other means, situated at a point which cannot be reached by the hook 6 of the handling arm 1.

40

CLAIMS

1. A load-changer for a vehicle, the appliance comprising an angular handling arm having one end 45 thereof rotatably mounted or capable of being rotatably mounted on a transverse shaft in the vehicle and provided or formed at its other, free end with a hooking means for engaging a corresponding holding means on a load carrier, wherein a part of 50 the handling arm which, in a normal loaded position, extends substantially vertically, carries a support arm which at one end thereof is pivoted at or near an outer end of said part of the handling arm, and wherein, by the action of one or more actuating 55 cylinders, the support arm can be swung between a folded position close to said part of the handling arm and an outward position in which the support arm constitutes an extension of said part of the handling arm.
- 60 2. A load changer according to claim 1, wherein the support arm comprises an open frame having sides rotatably mounted on each side of said part of the handling arm, the frame forming an opening for enclosing said part of the handling arm and/or for 65 the running therethrough of a wire, chain, cable or

the like.

3. A load changer according to claim 2, wherein the outer end of the support arm is completed by a bar and an end piece of the frame, which forms a 70 closed guide for one or more wires, chains or cables.

4. A load changer according to claim 1, claim 2 or claim 3, wherein the support arm is rotatably mounted on sideways protruding pins in a bracket on each side of said part of the handling arm, the 75 bracket forming a guide on each side of said part of the handling arm for a wire, chain, cable or the like.

5. A load changer according to any one of the preceding claims, wherein the support arm is arranged to be actuated by one or more hydraulic 80 cylinders for swinging to a chosen position between both its end positions.

6. A load changer according to any one of the preceding claims, wherein the support arm is rotatable in a rearward direction towards a load carrier 85 and said part of the handling arm is provided on its front side with means for hooking one or more wires, chains, cables or the like.

7. A load changer according to claim 6, when appendant to claims 3 and 4, wherein the means for 90 hooking one or more wires on the front of said part of the handling arm comprises a hydraulic cylinder with a hook at its end, arranged to tighten a loop of a wire originating from a load carrier and running under and in front of the bar at the support arm's outer end and behind and over the bracket's guide.

8. A load changer according to claim 5, wherein the support arm is arranged to be actuated by two parallel pivoted cylinders positioned on each side of the handling arm, each such cylinder being attached 100 at one end thereof to a point between the support arm's pivot point and outer end, and at its other end being rotatably mounted in a bracket on the front side of said part of the handling arm.

9. A load changer according to any one of the 105 preceding claims, wherein the support arm comprises a hook or like hooking or lift attachment at its outer end.

10. A load changer for a vehicle, the load changer being substantially as herein described with 110 reference to Figures 2, 3 and 4 of the accompanying drawings.